

CLAIMS

1. An image-forming production system, the system comprising;
a marking engine that prints an image onto at least one sheet
5 defining at least one printed sheet, the marking engine having an
output which feeds the at least one printed sheet at a first speed;
an inserter connected to receive the at least one printed sheet from
the marking engine output, the inserter having an inserter supply that
10 feeds an insert sheet to be placed sequentially with the printed sheet in
a print job, the insert supply feeding the insert sheet to the inserter at a
second speed; and
an inserter speed adjust unit that sequentially receives the at least
one printed sheet at the first speed and the insert sheet at the second
15 speed and outputs both at a third speed.
2. The image-forming production system of claim 1, wherein the inserter
speed adjust unit adjusts the timing at which the at least one printed
sheet and the insert sheet are output from the inserter speed adjust
unit to refine the timing at which the at least one printed sheet and the
20 insert sheet are outputted at the third speed.
3. The image-forming production system of Claim 1 further comprising an
output device connected downstream of the inserter, the output device
having an output device input speed at which it receives sheets to be
25 processed, wherein the output device input speed corresponds to the
third speed.

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4. The image-forming production system of claim 1 wherein:
- 5 the marking engine transmits a synch pulse signal used to indicate
a nominal time when the at least one printed sheet is to arrive at the
inserter speed adjust unit;
- the inserter speed adjust unit determines the actual arrival time of
the at least one printed sheet at the inserter speed adjust unit; and
- the inserter speed adjust unit compares the synch pulse signal to
the actual arrival time and uses the comparison to determine an adjust
10 time when the inserter speed adjust unit changes the speed of the at
least one sheet from the first speed to the third speed.
5. The image-forming production system of claim 4 wherein the inserter
speed adjust unit accelerates the at least one printed sheet from the
15 first speed to a higher third speed and (1) if the at least one printed
sheet arrives earlier than the nominal time, the inserter speed adjust
unit changes from the first speed to the third speed later than the adjust
time and (2) if the sheet arrives later than the nominal time, the inserter
speed adjust unit changes from the first speed to the third speed earlier
20 than the speed adjust time.
6. The image-forming production system of claim 1 wherein the inserter
speed adjust unit changes the speed of the at least one printed sheet
to a fourth speed different from the first and third speeds before the
25 speed is changed to the third speed.
7. The image-forming production system of claim 1 wherein the inserter
speed adjust unit first stops the at least one printed sheet after it is
received and before the inserter speed adjust unit adjusts the speed to
30 the third speed.

- 5 8. An image-forming production system, the system comprising;
a marking engine configured to output a plurality of printed sheets
at a first speed, the marking engine including a marking engine
controller; the marking engine controller transmitting a synch pulse
signal after a predetermined period of time;
an inserter connected to receive the at least one printed sheet from
the marking engine and output an insert sheet at a second speed to be
inserted between two of the plurality of printed sheets; and
an inserter speed adjust unit connected to receive the plurality of
10 printed sheets at the first speed and the insert sheet at the second
speed, the inserter speed adjust unit transmitting a signal to the
inserter speed adjust unit controller of an arrival of one of the printed
sheets and the arrival of the insert sheet the insert speed adjust unit
including an inserter speed adjust unit controller;
15 the inserter speed adjust unit controller being configured to
compare the measured arrival time with the synch pulse signal to
determine an adjust time at which to adjust a speed of the plurality of
printed sheets from the first speed to a third speed and to adjust the
speed of the insert sheet from the second speed to the third speed and
20 output the plurality of sheets and the insert sheet at the third speed.
- 25 9. The image-forming production system of Claim 8 wherein the inserter
speed adjust unit comprises speed adjust rollers and an inserter speed
adjust unit sensor.
- 30 10. The image-forming production system of Claim 8 comprising a stepper
motor to adjust the speed of the insert speed adjust unit.

5 11. The image-forming production system of Claim 8 further comprising an output device connected downstream of the inserter, the output device having an output device input speed at which it receives sheets to be processed, wherein the output device input speed corresponds to the third speed.

10 12. The image-forming production system of claim 8 wherein the inserter speed adjust unit accelerates the at least one printed sheet from the first speed to the third speed and (1) if the at least one printed sheet arrives earlier than the nominal time, the inserter speed adjust unit changes from the first speed to the third speed later than the adjust time and (2) if the sheet arrives later than the nominal time, the inserter speed adjust unit changes from the first speed to the third speed earlier than the speed adjust time.

15 13. The image-forming production system of claim 8 wherein the inserter speed adjust unit changes the speed of the at least one printed sheet to a fourth speed different from the first and third speeds before the speed is changed to the third speed.

20 14. The image-forming production system of claim 8 wherein the inserter speed adjust unit first stops the at least one printed sheet after it is received and before the inserter speed adjust unit adjusts the speed to the third speed.

25 15. The image-forming production system of claim 8 wherein the inserter sheet stops at a fixed position for a period of time the insert sheet is fed from the position at a fixed time after the synch pulse signal.

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16. A method of outputting sheets image-forming production system having a post marking engine inserter, the method comprising;
- in a marking engine, printing an image onto at least one sheet defining at least one printed sheet, and outputting at least one printed sheet at a first speed from the marking engine;
- feeding an insert sheet to be placed sequentially with the printed sheet in a print job at a second speed; and
- sequentially receiving the at least one printed sheet at the first speed and the insert sheet at the second speed and changing the speed of both to a third speed and adjusting the timing at which the at least one printed sheet and the insert sheet are output.
17. The method of claim 16 wherein the speed of the at least one printed sheet and the insert sheet are adjusted at an inserter speed adjust unit, the method comprising:
- transmitting a synch pulse signal indicating a nominal time when the at least one printed sheet is to arrive at the inserter speed adjust unit;
- determining the time from the synch pulse signal to an actual arrival time of the at least one printed sheet at the inserter speed adjust unit;
- determining a time difference to the nominal time between the synch pulse signal and the actual arrival time to determine an adjust time when the inserter speed adjust unit changes the speed of the at least one sheet from the first speed to the third speed;
- adjusting the speed of the at least one sheet from the first speed to the third speed;
- transmitting a synch signal indicating a nominal time when the insert sheet is to arrive at the inserter speed adjust unit;
- determining the time from the synch pulse signal to an actual arrival time of the insert sheet at the inserter speed adjust unit;
- determining a time difference to the nominal time between the synch pulse signal and the actual arrival time to determine an adjust

time when the inserter speed adjust unit changes the speed of the insert sheet from the first speed to the third speed; and
adjusting the speed of the insert sheet from the first speed to the third speed.

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18. The method of claim 16 comprising accelerating the at least one printed sheet from the first speed to the third speed and (1) if the at least one printed sheet arrives earlier than the nominal time, changing from the first speed to the third speed later than the adjust time and (2) if the sheet arrives later than the nominal time, from the first speed to the third speed earlier than the speed adjust time.

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19. The method of claim 16 further comprising changing the speed of the at least one printed sheet to a fourth speed different from the first and third speeds before the speed is changed to the third speed.

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20. The method of claim 16 further comprising stopping the at least one printed sheet or inserter sheet after it is received in the inserter speed adjust unit and before the speed is changed to the third speed.

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